

SEQUENCE LISTING

<110> Cytos Biotechnology AG  
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 Schwarz, Katrin

<120> PACKAGED VIRUS-LIKE PARTICLES

<130> C62863PC

<150> US 60/485,717

<151> 2003-07-10

<160> 60

<170> PatentIn version 3.2

<210> 1

<211> 132

<212> PRT

<213> Bacteriophage Q-beta

<400> 1

Ala Lys Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Lys Asp Gly Lys  
 1 5 10 15

Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val  
 20 25 30

Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val  
 35 40 45

Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val  
 50 55 60

Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys  
 65 70 75 80

Asp Pro Ser Val Thr Arg Gln Ala Tyr Ala Asp Val Thr Phe Ser Phe  
 85 90 95

Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu  
 100 105 110

Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu  
 115 120 125

Asn Pro Ala Tyr  
 130

<210> 2

<211> 329  
 <212> PRT  
 <213> Bacteriophage Q-beta

<400> 2

Met Ala Lys Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Lys Asp Gly  
 1 5 10 15

Lys Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly  
 20 25 30

Val Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg  
 35 40 45

Val Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys  
 50 55 60

Val Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser  
 65 70 75 80

Cys Asp Pro Ser Val Thr Arg Gln Ala Tyr Ala Asp Val Thr Phe Ser  
 85 90 95

Phe Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu  
 100 105 110

Leu Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln  
 115 120 125

Leu Asn Pro Ala Tyr Trp Thr Leu Leu Ile Ala Gly Gly Gly Ser Gly  
 130 135 140

Ser Lys Pro Asp Pro Val Ile Pro Asp Pro Pro Ile Asp Pro Pro Pro  
 145 150 155 160

Gly Thr Gly Lys Tyr Thr Cys Pro Phe Ala Ile Trp Ser Leu Glu Glu  
 165 170 175

Val Tyr Glu Pro Pro Thr Lys Asn Arg Pro Trp Pro Ile Tyr Asn Ala  
 180 185 190

Val Glu Leu Gln Pro Arg Glu Phe Asp Val Ala Leu Lys Asp Leu Leu  
 195 200 205

Gly Asn Thr Lys Trp Arg Asp Trp Asp Ser Arg Leu Ser Tyr Thr Thr  
 210 215 220

Phe Arg Gly Cys Arg Gly Asn Gly Tyr Ile Asp Leu Asp Ala Thr Tyr  
 225 230 235 240

Leu Ala Thr Asp Gln Ala Met Arg Asp Gln Lys Tyr Asp Ile Arg Glu  
 245 250 255

Gly Lys Lys Pro Gly Ala Phe Gly Asn Ile Glu Arg Phe Ile Tyr Leu  
 260 265 270

Lys Ser Ile Asn Ala Tyr Cys Ser Leu Ser Asp Ile Ala Ala Tyr His  
 275 280 285

Ala Asp Gly Val Ile Val Gly Phe Trp Arg Asp Pro Ser Ser Gly Gly  
 290 295 300

Ala Ile Pro Phe Asp Phe Thr Lys Phe Asp Lys Thr Lys Cys Pro Ile  
 305 310 315 320

Gln Ala Val Ile Val Val Pro Arg Ala  
 325

<210> 3  
 <211> 128  
 <212> PRT  
 <213> Bacteriophage PP7

<400> 3

Met Ser Lys Thr Ile Val Leu Ser Val Gly Glu Ala Thr Arg Thr Leu  
 1 5 10 15

Thr Glu Ile Gln Ser Thr Ala Asp Arg Gln Ile Phe Glu Glu Lys Val  
 20 25 30

Gly Pro Leu Val Gly Arg Leu Arg Leu Thr Ala Ser Leu Arg Gln Asn  
 35 40 45

Gly Ala Lys Thr Ala Tyr Arg Val Asn Leu Lys Leu Asp Gln Ala Asp  
 50 55 60

Val Val Asp Cys Ser Thr Ser Val Cys Gly Glu Leu Pro Lys Val Arg  
 65 70 75 80

Tyr Thr Gln Val Trp Ser His Asp Val Thr Ile Val Ala Asn Ser Thr  
 85 90 95

Glu Ala Ser Arg Lys Ser Leu Tyr Asp Leu Thr Lys Ser Leu Val Ala

100

105

110

Thr Ser Gln Val Glu Asp Leu Val Val Asn Leu Val Pro Leu Gly Arg  
 115 120 125

<210> 4  
 <211> 132  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Bacteriophage Qbeta 240 mutant

<400> 4

Ala Lys Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Arg Asp Gly Lys  
 1 5 10 15

Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val  
 20 25 30

Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val  
 35 40 45

Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val  
 50 55 60

Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys  
 65 70 75 80

Asp Pro Ser Val Thr Arg Gln Lys Tyr Ala Asp Val Thr Phe Ser Phe  
 85 90 95

Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu  
 100 105 110

Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu  
 115 120 125

Asn Pro Ala Tyr  
 130

<210> 5  
 <211> 132  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Bacteriophage Q-beta 243 mutant

&lt;400&gt; 5

Ala Lys Leu Glu Thr Val Thr Leu Gly Lys Ile Gly Lys Asp Gly Lys  
 1 5 10 15

Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val  
 20 25 30

Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val  
 35 40 45

Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val  
 50 55 60

Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys  
 65 70 75 80

Asp Pro Ser Val Thr Arg Gln Lys Tyr Ala Asp Val Thr Phe Ser Phe  
 85 90 95

Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu  
 100 105 110

Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu  
 115 120 125

Asn Pro Ala Tyr  
 130

&lt;210&gt; 6

&lt;211&gt; 132

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Bacteriophage Q-beta 250 mutant

&lt;400&gt; 6

Ala Arg Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Arg Asp Gly Lys  
 1 5 10 15

Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val  
 20 25 30

Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val  
 35 40 45

Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val

50                                      55                                      60  
 Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys  
 65                                      70                                      75                                      80  
 Asp Pro Ser Val Thr Arg Gln Lys Tyr Ala Asp Val Thr Phe Ser Phe  
                                     85                                      90                                      95  
 Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu  
                                     100                                      105                                      110  
 Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu  
                                     115                                      120                                      125  
 Asn Pro Ala Tyr  
                                     130  
 <210> 7  
 <211> 132  
 <212> PRT  
 <213> Artificial Sequence  
 <220>  
 <223> Bacteriophage Q-beta 251 mutant  
 <400> 7  
 Ala Lys Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Lys Asp Gly Arg  
 1                                      5                                      10                                      15  
 Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val  
                                     20                                      25                                      30  
 Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val  
                                     35                                      40                                      45  
 Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val  
                                     50                                      55                                      60  
 Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys  
 65                                      70                                      75                                      80  
 Asp Pro Ser Val Thr Arg Gln Lys Tyr Ala Asp Val Thr Phe Ser Phe  
                                     85                                      90                                      95  
 Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu  
                                     100                                      105                                      110

Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu  
 115 120 125

Asn Pro Ala Tyr  
 130

<210> 8  
 <211> 132  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Bacteriophage Q-beta 259 mutant

<400> 8

Ala Arg Leu Glu Thr Val Thr Leu Gly Asn Ile Gly Lys Asp Gly Arg  
 1 5 10 15

Gln Thr Leu Val Leu Asn Pro Arg Gly Val Asn Pro Thr Asn Gly Val  
 20 25 30

Ala Ser Leu Ser Gln Ala Gly Ala Val Pro Ala Leu Glu Lys Arg Val  
 35 40 45

Thr Val Ser Val Ser Gln Pro Ser Arg Asn Arg Lys Asn Tyr Lys Val  
 50 55 60

Gln Val Lys Ile Gln Asn Pro Thr Ala Cys Thr Ala Asn Gly Ser Cys  
 65 70 75 80

Asp Pro Ser Val Thr Arg Gln Lys Tyr Ala Asp Val Thr Phe Ser Phe  
 85 90 95

Thr Gln Tyr Ser Thr Asp Glu Glu Arg Ala Phe Val Arg Thr Glu Leu  
 100 105 110

Ala Ala Leu Leu Ala Ser Pro Leu Leu Ile Asp Ala Ile Asp Gln Leu  
 115 120 125

Asn Pro Ala Tyr  
 130

<210> 9  
 <211> 185  
 <212> PRT  
 <213> Hepatitis B virus

<400> 9

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Asn Asn Leu Glu Asp Pro Ala  
65 70 75 80

Ser Arg Asp Leu Val Val Asn Tyr Val Asn Thr Asn Met Gly Leu Lys  
85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
130 135 140

Glu Thr Thr Val Val Arg Arg Arg Asp Arg Gly Arg Ser Pro Arg Arg  
145 150 155 160

Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg  
165 170 175

Arg Ser Gln Ser Arg Glu Ser Gln Cys  
180 185

<210> 10  
<211> 185  
<212> PRT  
<213> Hepatitis B virus

<400> 10

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
20 25 30



Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Asn Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Asp Leu Val Val Asn Tyr Val Asn Thr Asn Met Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Asp Arg Gly Arg Ser Pro Arg Arg  
 145 150 155 160

Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg  
 165 170 175

Arg Ser Gln Ser Arg Glu Ser Gln Cys  
 180 185

<210> 11  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> CyCpG

<400> 11  
 tccatgacgt tcctgaataa t

21

<210> 12  
 <211> 594  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Hepatitis B virus containing p33

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(594)

&lt;400&gt; 12

atg gac att gac cct tat aaa gaa ttt gga gct act gtg gag tta ctc	48
Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu	
1 5 10 15	
tcg ttt ttg cct tct gac ttc ttt cct tcc gtc aga gat ctc cta gac	96
Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp	
20 25 30	
acc gcc tca gct ctg tat cga gaa gcc tta gag tct cct gag cat tgc	144
Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys	
35 40 45	
tca cct cac cat act gca ctc agg caa gcc att ctc tgc tgg ggg gaa	192
Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu	
50 55 60	
ttg atg act cta gct acc tgg gtg ggt aat aat ttg gaa gat cca gca	240
Leu Met Thr Leu Ala Thr Trp Val Gly Asn Asn Leu Glu Asp Pro Ala	
65 70 75 80	
tcc agg gat cta gta gtc aat tat gtt aat act aac atg ggt tta aag	288
Ser Arg Asp Leu Val Val Asn Tyr Val Asn Thr Asn Met Gly Leu Lys	
85 90 95	
atc agg caa cta ttg tgg ttt cat ata tct tgc ctt act ttt gga aga	336
Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg	
100 105 110	
gag act gta ctt gaa tat ttg gtc tct ttc gga gtg tgg att cgc act	384
Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr	
115 120 125	
cct cca gcc tat aga cca cca aat gcc cct atc tta tca aca ctt ccg	432
Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro	
130 135 140	
gaa act act gtt gtt aga cga cgg gac cga ggc agg tcc cct aga aga	480
Glu Thr Thr Val Val Arg Arg Arg Asp Arg Gly Arg Ser Pro Arg Arg	
145 150 155 160	
aga act ccc tcg cct cgc aga cgc aga tct caa tcg ccg cgt cgc aga	528
Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg	
165 170 175	
aga tct caa tct cgg gaa tct caa tgt ctt ctc ctt aaa gct gtt tac	576
Arg Ser Gln Ser Arg Glu Ser Gln Cys Leu Leu Leu Lys Ala Val Tyr	
180 185 190	
aac ttc gct acc atg taa	594
Asn Phe Ala Thr Met	
195	

&lt;210&gt; 13

<211> 197  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Hepatitis B virus containing p33

<400> 13

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Asn Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Asp Leu Val Val Asn Tyr Val Asn Thr Asn Met Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Asp Arg Gly Arg Ser Pro Arg Arg  
 145 150 155 160

Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg  
 165 170 175

Arg Ser Gln Ser Arg Glu Ser Gln Cys Leu Leu Leu Lys Ala Val Tyr  
 180 185 190

Asn Phe Ala Thr Met  
 195

<210> 14  
 <211> 9  
 <212> PRT  
 <213> Homo sapiens

<400> 14

Lys Thr Trp Gly Gln Tyr Trp Gln Val  
 1 5

<210> 15  
 <211> 9  
 <212> PRT  
 <213> Homo sapiens

<400> 15

Ile Thr Asp Gln Val Pro Phe Ser Val  
 1 5

<210> 16  
 <211> 9  
 <212> PRT  
 <213> Homo sapiens

<400> 16

Tyr Leu Glu Pro Gly Pro Val Thr Ala  
 1 5

<210> 17  
 <211> 10  
 <212> PRT  
 <213> Homo sapiens

<400> 17

Leu Leu Asp Gly Thr Ala Thr Leu Arg Leu  
 1 5 10

<210> 18  
 <211> 10  
 <212> PRT  
 <213> Homo sapiens

<400> 18

Val Leu Tyr Arg Tyr Gly Ser Phe Ser Val  
 1 5 10

<210> 19  
 <211> 9  
 <212> PRT  
 <213> Homo sapiens

<400> 19

Ala Ala Gly Ile Gly Ile Leu Thr Val  
1 5

<210> 20  
<211> 9  
<212> PRT  
<213> Homo sapiens

<400> 20

Ile Leu Thr Val Ile Leu Gly Val Leu  
1 5

<210> 21  
<211> 9  
<212> PRT  
<213> Homo sapiens

<400> 21

Met Leu Leu Ala Val Leu Tyr Cys Leu  
1 5

<210> 22  
<211> 9  
<212> PRT  
<213> Homo sapiens

<400> 22

Tyr Met Asp Gly Thr Met Ser Gln Val  
1 5

<210> 23  
<211> 9  
<212> PRT  
<213> Homo sapiens

<400> 23

Val Leu Pro Asp Val Phe Ile Arg Cys  
1 5

<210> 24  
<211> 9  
<212> PRT  
<213> Homo sapiens

<400> 24

Phe Leu Trp Gly Pro Arg Ala Leu Val  
1 5

<210> 25

<211> 9  
 <212> PRT  
 <213> Homo sapiens

<400> 25

Tyr Leu Ser Gly Ala Asn Leu Asn Leu  
 1 5

<210> 26  
 <211> 9  
 <212> PRT  
 <213> Homo sapiens

<400> 26

Arg Met Pro Glu Ala Ala Pro Pro Val  
 1 5

<210> 27  
 <211> 9  
 <212> PRT  
 <213> Homo sapiens

<400> 27

Ser Thr Pro Pro Pro Gly Thr Arg Val  
 1 5

<210> 28  
 <211> 9  
 <212> PRT  
 <213> Homo sapiens

<400> 28

Leu Leu Gly Arg Asn Ser Phe Glu Val  
 1 5

<210> 29  
 <211> 9  
 <212> PRT  
 <213> Homo sapiens

<400> 29

Lys Ile Phe Gly Ser Leu Ala Phe Leu  
 1 5

<210> 30  
 <211> 9  
 <212> PRT  
 <213> Homo sapiens

<400> 30

Ile Ile Ser Ala Val Val Gly Ile Leu  
1 5

<210> 31  
<211> 8  
<212> PRT  
<213> Homo sapiens

<400> 31

Thr Leu Gly Ile Val Cys Pro Ile  
1 5

<210> 32  
<211> 131  
<212> PRT  
<213> Bacteriophage AP205

<400> 32

Met Ala Asn Lys Pro Met Gln Pro Ile Thr Ser Thr Ala Asn Lys Ile  
1 5 10 15

Val Trp Ser Asp Pro Thr Arg Leu Ser Thr Thr Phe Ser Ala Ser Leu  
20 25 30

Leu Arg Gln Arg Val Lys Val Gly Ile Ala Glu Leu Asn Asn Val Ser  
35 40 45

Gly Gln Tyr Val Ser Val Tyr Lys Arg Pro Ala Pro Lys Pro Glu Gly  
50 55 60

Cys Ala Asp Ala Cys Val Ile Met Pro Asn Glu Asn Gln Ser Ile Arg  
65 70 75 80

Thr Val Ile Ser Gly Ser Ala Glu Asn Leu Ala Thr Leu Lys Ala Glu  
85 90 95

Trp Glu Thr His Lys Arg Asn Val Asp Thr Leu Phe Ala Ser Gly Asn  
100 105 110

Ala Gly Leu Gly Phe Leu Asp Pro Thr Ala Ala Ile Val Ser Ser Asp  
115 120 125

Thr Thr Ala  
130

<210> 33  
<211> 131  
<212> PRT

<213> Artificial Sequence

<220>

<223> Bacteriophage AP205 mutant

<400> 33

Met Ala Asn Lys Thr Met Gln Pro Ile Thr Ser Thr Ala Asn Lys Ile  
1 5 10 15

Val Trp Ser Asp Pro Thr Arg Leu Ser Thr Thr Phe Ser Ala Ser Leu  
20 25 30

Leu Arg Gln Arg Val Lys Val Gly Ile Ala Glu Leu Asn Asn Val Ser  
35 40 45

Gly Gln Tyr Val Ser Val Tyr Lys Arg Pro Ala Pro Lys Pro Glu Gly  
50 55 60

Cys Ala Asp Ala Cys Val Ile Met Pro Asn Glu Asn Gln Ser Ile Arg  
65 70 75 80

Thr Val Ile Ser Gly Ser Ala Glu Asn Leu Ala Thr Leu Lys Ala Glu  
85 90 95

Trp Glu Thr His Lys Arg Asn Val Asp Thr Leu Phe Ala Ser Gly Asn  
100 105 110

Ala Gly Leu Gly Phe Leu Asp Pro Thr Ala Ala Ile Val Ser Ser Asp  
115 120 125

Thr Thr Ala  
130

<210> 34

<211> 5

<212> PRT

<213> Artificial Sequence

<220>

<223> HBcAg peptide

<400> 34

Gly Gly Lys Gly Gly  
1 5

<210> 35

<211> 152

<212> PRT

<213> Artificial Sequence



&lt;220&gt;

&lt;223&gt; HBcAg variant

&lt;400&gt; 35

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ala Ala Leu Tyr Arg Asp Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Asp  
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Thr Asn Leu Glu Asp Gly Gly  
 65 70 75 80

Lys Gly Gly Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Val  
 85 90 95

Gly Leu Lys Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr  
 100 105 110

Phe Gly Arg Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp  
 115 120 125

Ile Arg Thr Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser  
 130 135 140

Thr Leu Pro Glu Thr Thr Val Val  
 145 150

&lt;210&gt; 36

&lt;211&gt; 185

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; HBcAg variant

&lt;400&gt; 36

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp

	20		25		30										
Thr	Ala	Ser	Ala	Leu	Tyr	Arg	Glu	Ala	Leu	Glu	Ser	Pro	Glu	His	Ser
	35						40					45			
Ser	Pro	His	His	Thr	Ala	Leu	Arg	Gln	Ala	Ile	Leu	Cys	Trp	Gly	Glu
	50					55					60				
Leu	Met	Thr	Leu	Ala	Thr	Trp	Val	Gly	Asn	Asn	Leu	Glu	Asp	Pro	Ala
65					70					75					80
Ser	Arg	Asp	Leu	Val	Val	Asn	Tyr	Val	Asn	Thr	Asn	Met	Gly	Leu	Lys
				85					90					95	
Ile	Arg	Gln	Leu	Leu	Trp	Phe	His	Ile	Ser	Ser	Leu	Thr	Phe	Gly	Arg
			100					105						110	
Glu	Thr	Val	Leu	Glu	Tyr	Leu	Val	Ser	Phe	Gly	Val	Trp	Ile	Arg	Thr
		115					120					125			
Pro	Pro	Ala	Tyr	Arg	Pro	Pro	Asn	Ala	Pro	Ile	Leu	Ser	Thr	Leu	Pro
	130					135					140				
Glu	Thr	Thr	Val	Val	Arg	Arg	Arg	Asp	Arg	Gly	Arg	Ser	Pro	Arg	Arg
145					150					155					160
Arg	Thr	Pro	Ser	Pro	Arg	Arg	Arg	Arg	Ser	Gln	Ser	Pro	Arg	Arg	Arg
				165					170					175	
Arg	Ser	Gln	Ser	Arg	Glu	Ser	Gln	Cys							
			180					185							

<210> 37  
 <211> 10  
 <212> PRT  
 <213> Homo sapiens

<400> 37

Glu	Ala	Ala	Gly	Ile	Gly	Ile	Leu	Thr	Val
1				5					10

<210> 38  
 <211> 10  
 <212> PRT  
 <213> Homo sapiens

<400> 38

1

<210>

<220>

<400> 39

<210>

<220>

<400> 40

 $\langle 210 \rangle$  $\langle 220 \rangle$ 

<400> 41

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<400> 42

<210>

<220>

<400>

gggggggacg atcgtcgggg gg 22

<210> 44  
 <211> 24  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> oligonucleotide G7-7

<400> 44.  
 ggggggggac gatcgtcggg gggg 24

<210> 45  
 <211> 26  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> oligonucleotide G8-8

<400> 45  
 gggggggggga cgatcgtcgg gggggg 26

<210> 46  
 <211> 28  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> oligonucleotide G9-9

<400> 46  
 ggggggggggg acgatcgtcg gggggggg 28

<210> 47  
 <211> 30  
 <212> DNA  
 <213> Artificial sequence

<220>  
 <223> oligonucleotide G6

<400> 47  
 gggggggcgac gacgatcgtc gtcggggggg 30

<210> 48  
 <211> 23  
 <212> DNA  
 <213> Artificial Sequence

<220>  
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gataccgtcg acc 253

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